R&S®CLGD
DOCSIS Cable Load Generator
Specifications

ROHDE&SCHWARZ

Broadcast & Media
Test & Measurement

Data Sheet | 02.00

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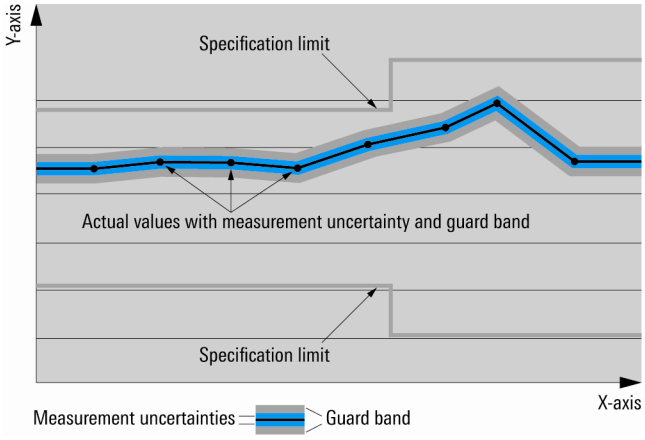
Definitions

General
Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to
- All internal automatic adjustments performed, if applicable

Specifications with limits
Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as <, ≤, >, ≥, ±, or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.



Specifications without limits
Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

Typical data (typ.)
Characterizes product performance by means of representative information for the given parameter. When marked with <, > or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

Nominal values (nom.)
Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

Measured values (meas.)
Characterize expected product performance by means of measurement results gained from individual samples.

Uncertainties
Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Device settings and GUI parameters are indicated as follows: “parameter: value”.

Typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

RF characteristics

Frequency

Total frequency range, upstream	R&S®CLGD base unit	5 MHz to 204 MHz
Total frequency range, downstream	R&S®CLGD base unit	47 MHz to 1218 MHz
	with R&S®CLGD-K3018	47 MHz to 1794 MHz
Settable frequency range		depends on selected mode (see Operating modes on page 13)
Step size of setting		1 Hz

Level

Downstream outputs, low and high

Maximum sum level	1 active DOCSIS 3.1 channel	59 dBmV
	1 active J.83/A/B/C channel	62 dBmV
	2 active J.83/A/B/C channels	61 dBmV
	4 active J.83/A/B/C channels	60 dBmV
	158 active J.83/A/B/C channels	57 dBmV
Setting range of sum level		12 dBmV to max. sum level
Level setting range per channel [1]	when more than one channel is active	0 to max. level per channel [2]
Step size of setting		0.1 dB
Level uncertainty	at maximum level, 0 dB tilt and 0 dB attenuation	
	1 active channel	typ. ± 0.25 dB, max. ≤ ± 1.0 dB
	≥ 2 active channels	max. ≤ ± 1.5 dB

Upstream output

Maximum sum level	1 active DOCSIS 3.1 channel	59 dBmV
	1 active 6.4 MHz DOCSIS 3.0 channel	62 dBmV
	2 active 6.4 MHz DOCSIS 3.0 channels	61 dBmV
	4 active 6.4 MHz DOCSIS 3.0 channels	60 dBmV
Setting range of sum level		12 dBmV to max. sum level
Level setting range per channel [1]	when more than one channel is active	0 to max. level per channel [2]
Step size of setting		0.1 dB
Level uncertainty	at maximum level and 0 dB attenuation	
	1 active channel	typ. ± 0.25 dB, max. ≤ ± 1.0 dB
	≥ 2 active channels	max. ≤ ± 1.5 dB

CSO/CTB output

Maximum sum level	1 active DOCSIS 3.1 channel	27 dBmV
	1 active J.83/A/B/C channel	30 dBmV
	2 active J.83/A/B/C channels	29 dBmV
	4 active J.83/A/B/C channels	28 dBmV
	158 active J.83/A/B/C channels	25 dBmV
Setting range of sum level		12 dBmV to 30 dBmV
Level setting range per channel [1]	when more than one channel is active	0 to max. level per channel [2]
Step size of setting		0.1 dB
Level uncertainty	at maximum level	
	1 active channel	typ. ± 0.25 dB, max. ≤ ± 1.0 dB
	≥ 2 active channels	max. ≤ ± 1.5 dB

[1] When more than one channel is active, the levels of the different channels are set in the digital signal processing unit. In the case of large level differences between the active channels, the signal quality of the channels with low level deteriorates.

[2] The maximum level per channel is determined by the maximum sum level divided by the number of active channels.

Spectral purity

CSO/CTB	with CW carriers in 80 channels, at CSO/CTB output, in line with ANSI/SCTE 06 2009 and ANSI/SCTE 161 2009	typ. 70 dB
SNR	with 157 active J.83/A/B/C channels	
	50 MHz to 350 MHz	> 52 dB
	350 MHz to 700 MHz	> 51 dB
	700 MHz to 1000 MHz	> 50 dB
Spurious	50 MHz to 1000 MHz	≤ –63 dBc
	1000 MHz to 1218 MHz	≤ –59 dBc
Single-sideband phase noise	1 kHz to 10 kHz	≤ –56 dBc
	10 kHz to 100 kHz	≤ –60 dBc
	100 kHz to 1 MHz	≤ –68 dBc
	1 MHz to 10 MHz	≤ –70 dBc
	10 MHz to 100 MHz	≤ –61 dBc

Modulation systems

Downstream (R&S®CLGD-K200 option)

DOCSIS 3.1

Modulation		COFDM
Bandwidth		24 MHz to 192 MHz
		can be set as the encompassed spectrum in MHz or as the number of guard subcarriers
Frequency		can be set as the frequency of the 0th subcarrier or as the channel center frequency
FFT size		4k (50 kHz offset from carrier)
		8k (25 kHz offset from carrier)
Guard subcarrier	FFT size = 4k (50 kHz offset from carrier)	148 to 2048
	FFT size = 8k (25 kHz offset from carrier)	296 to 4096
MER	f = 500 MHz, bandwidth = 192 MHz	typ. > 53 dB
	2 × 192 MHz OFDM and 24 × J.83/A/B/C	
	f < 600 MHz	≥ 50 dB
	600 MHz ≤ f < 1002 MHz	≥ 47 dB
	1002 MHz ≤ f < 1218 MHz	≥ 45 dB
	1 × 24 MHz OFDM	
	f < 600 MHz	≥ 48 dB
	600 MHz ≤ f < 1002 MHz	≥ 45 dB
	1002 MHz ≤ f < 1218 MHz	≥ 43 dB
PLC location		settable, subcarrier index or frequency of lowest PLC carrier
PLC constellation		16QAM
PLC content	generated internally	dummy data
	external feed	data over IP
NCP constellation		QPSK, 16QAM, 64QAM
Cyclic prefix		0 µs, 0.9375 µs, 1.25 µs, 2.5 µs, 3.75 µs, 5 µs
Windowing		0 µs, 0.3125 µs, 0.625 µs, 0.9375 µs, 1.25 µs
Exclusion band		up to 3 bands, each specified by start subcarrier and number of subcarriers
Continuous pilot parameter		48 to 120
Interleaver depth	FFT size = 4k (50 kHz offset from carrier)	max. 32
	FFT size = 8k (25 kHz offset from carrier)	max. 16
FEC codeword shortening		on/off, can be set for each profile
Number of profiles		1 to 4
Profile constellation		16QAM, 64QAM, 128QAM, 256QAM, 512QAM, 1024QAM, 2048QAM, 4096QAM
	overrange [3]	8192QAM, 16384QAM
Profile content	generated internally	MACLFSR (PRBS)
	external feed	data over IP
Advanced options		import and export of configuration files for complex channel configurations

[3] The R&S®CLGD can generate signals with 8192QAM and 16384QAM. This might, however, violate some specifications of this data sheet.

Digital TV standards and DOCSIS 3.0

J.83/A (DVB-C)

Standard		ITU-T J.83 Annex A, EN 300429
Modulation		single-carrier QAM
Bandwidth		8 MHz
Constellation		64QAM, 256QAM
Symbol rate		5 Msymbol/s to 6.952 Msymbol/s
Rolloff		0.15
Interleaver		12, 17
MER		typ. 45 dB
Content	generated internally	PRBS, MPEG-2 transport stream
	external feed	MPEG-2 transport stream over IP

J.83/B

Standard		ITU-T J.83 Annex B
Modulation		single-carrier QAM
Bandwidth		6 MHz
Constellation		64QAM, 256QAM
Symbol rate		4 Msymbol/s to 5.37 Msymbol/s
Rolloff		0.12, 0.18
Interleaver		in line with ITU-T J.83 Annex B
MER		typ. 45 dB
Content	generated internally	PRBS, MPEG-2 transport stream
	external feed	MPEG-2 transport stream over IP

J.83/C (ISDB-C)

Standard		ITU-T J.83 Annex C
Modulation		single-carrier QAM
Bandwidth		6 MHz
Constellation		64QAM, 256QAM
Symbol rate		4 Msymbol/s to 5.325 Msymbol/s
Rolloff		0.13
Interleaver		12, 17
MER		typ. 45 dB
Content	generated internally	PRBS, MPEG-2 transport stream
	external feed	MPEG-2 transport stream over IP

Analog TV standards

Standards		PAL, NTSC
Bandwidth	NTSC	6 MHz
	PAL	7 MHz, 8 MHz
Content		color bar test pattern with 1 kHz sinusoidal tone

Arbitrary waveform generator

Number of samples per ARB waveform file		≤ 67.1 Msample (2^{26} samples)
Value range		≤ ±32767
File size		≤ 256 Mbyte
Included ARB waveform files	for analog TV	NTSC, PAL with 7 MHz bandwidth, PAL with 8 MHz bandwidth
	for digital TV and DOCSIS 3.0	DVB-C with 64QAM, DVB-C with 256QAM, J.83/B with 64QAM, J.83/B with 256QAM, J.83/C with 64QAM, J.83/C with 256QAM, ISDB-T
	for DOCSIS 3.1	DOCSIS 3.1 with 192 MHz bandwidth
Narrowband ARB generator in fundamental frequency range		
Frequency range		47 MHz to 1002 MHz
ARB bandwidth		≤ 10 MHz
Number of simultaneously played ARB waveform files		max. 4
Number of RF channels per waveform file [4]		max. 160
Sample rate per waveform file	when 4 files are played simultaneously	≤ 18 Msample/s
Broadband ARB generator in fundamental frequency range		
Frequency range		47 MHz to 1218 MHz
ARB bandwidth		≤ 200 MHz
Number of simultaneously played ARB waveform files	bandwidth ≤ 100 MHz	max. 2
	100 MHz < bandwidth ≤ 200 MHz	1
Number of RF channels per waveform file		1
Sample rate per waveform file	when 2 files are played simultaneously	≤ 170 Msample/s
	when 1 file is played	≤ 340 Msample/s
Broadband ARB generator in expanded frequency range (R&S®CLGD-K3018 required)		
Frequency range		1218 MHz to 1794 MHz
ARB bandwidth		≤ 200 MHz
Number of simultaneously played ARB waveform files	bandwidth ≤ 100 MHz	max. 2 (in addition to another max. 2 in the low-band broadband ARB generator)
	100 MHz < bandwidth ≤ 200 MHz	1 (in addition to another one in the low-band broadband ARB generator)
Number of RF channels per waveform file		1
Sample rate per waveform file	when 2 files are played simultaneously	≤ 170 Msample/s
	when 1 file is played	≤ 340 Msample/s

Transport stream generator

The R&S®CLGD comes with a built-in transport stream generator that can play back MPEG-2 transport stream files. The generated transport stream can be used as the content for a J.83/A/B/C channel.

Transport stream format		MPEG-2, SPTS with 1 PAT and 1 PMT
Packet size		188 byte
Transport stream file size		max. 188 Mbyte
File format		.trp, .ts, .mpg
Seamless loop playback		can be switched on and off for continuity counter, PCR, DTS/PTS, TDT/TOT
Bit rate		≤ bit rate of channel

[4] An ARB waveform file with a bandwidth of up to 10 MHz can be played on multiple RF channels at the same time. ARB waveform files with bandwidths > 10 MHz can be played only on one RF channel.

Upstream (R&S®CLGD-K300 option)

DOCSIS 3.1

Modulation		burst OFDMA
Burst timing		controlled via trigger input
FFT size		2k (50 kHz offset from carrier)
		4k (25 kHz offset from carrier)
Bandwidth	FFT size = 2k (50 kHz offset from carrier)	10 MHz to 96 MHz
	FFT size = 4k (25 kHz offset from carrier)	6.4 MHz to 96 MHz
		can be set as the encompassed spectrum in MHz or as the number of guard subcarriers
Constellation		QPSK, 8QAM, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, 512QAM, 1024QAM, 2048QAM, 4096QAM
Cyclic prefix		0.9375 µs, 1.25 µs, 1.525 µs, 1.875 µs, 2.1875 µs, 2.5 µs, 2.8125 µs, 3.125 µs, 3.75 µs, 5 µs, 6.25 µs
Windowing		0 µs, 0.3125 µs, 0.625 µs, 0.9375 µs, 1.25 µs, 1.5625 µs, 1.875 µs, 2.1875 µs
Pilot structure	FFT size 2k (50 kHz offset from carrier)	1 to 7
	FFT size 4k (25 kHz offset from carrier)	8 to 14
	with pilot boosting	5 to 7 and 12 to 14
Burst types		data
		initial ranging
		fine ranging
		bandwidth request
		wideband probe
Settable parameters	data	pilot pattern, constellation, scrambler, scrambler seed, number of frames, user starting minislot, user ending minislot, content
	initial ranging	number of subcarriers, number of minislots, starting minislot, preamble pattern, preamble value offset, preamble length, MAC address, downstream channel ID
	fine ranging	number of subcarriers, number of minislots, starting minislot, preamble pattern, preamble value offset, data
	bandwidth request	number of minislots, symbols, subslot, requested number of bytes, SID
	wideband probe	start subcarrier, subcarrier skipping, symbols in frame
Content		PRBS or user-defined file

DOCSIS 3.0 A-TDMA

Modulation		burst A-TDMA
Burst timing		controlled via trigger input
Bandwidth		0.8 MHz, 1.6 MHz, 3.2 MHz, 6.4 MHz
Constellation		QPSK, DQPSK, 8QAM, 16QAM, D16QAM, 32QAM, 64QAM
Preamble pattern		user-defined hex string
Preamble length	integer number of QPSK symbols	up to 1536 bit
Preamble value offset		multiple of symbol size
Preamble type		QPSK0, QPSK1
FEC error correction parameter T	no FEC	T = 0
	FEC with 2 × T parity bytes	T = 1 to 16
FEC codeword information bytes parameter k		16 to 253
Last codeword length		fixed, shortened
Reed-Solomon interleaver mode		disabled, fixed, dynamic
Reed-Solomon interleaver depth	interleaver mode = fixed	2 to (2048 / (k + 2T))
Reed-Solomon interleaver block size	interleaver mode = dynamic	2 × (k + 2T) to 2048
Scrambler		on, off
Scrambler seed		15 bit from user-defined hex string
Content		PRBS or user-defined file

DOCSIS 3.0 S-CDMA

Modulation		burst S-CDMA
Burst timing		controlled via trigger input
Bandwidth		1.6 MHz, 3.2 MHz, 6.4 MHz
Constellation		QPSK, 8QAM, 16QAM, 32QAM, 64QAM, TCM-QPSK, TCM-8QAM, TCM-16QAM, TCM-32QAM, TCM-64QAM, TCM-128QAM
Preamble pattern		user-defined hex string
Preamble length	integer number of QPSK symbols	up to 1536 bit
Preamble value offset		multiple of symbol size
Preamble type		QPSK0, QPSK1
FEC error correction parameter T	no FEC	T = 0
	FEC with 2 × T parity bytes	T = 1 to 16
FEC codeword information bytes parameter k		16 to 253
Last codeword length		fixed, shortened
Scrambler		on, off
Scrambler seed		15 bit from user-defined hex string
Spreading intervals per frame		1 to 32
Codes per minislot		2 to 32
Active codes	mode 1	64 to 128
Symbol interleaver step size		1 to 31
Codes per subframe		2 to number of active codes
Code hopping seed		settable
Content		PRBS or user-defined file

Arbitrary waveform generator

Bandwidth		≤ 100 MHz
Burst timing		controlled via trigger input
Number of simultaneously played ARB waveform files	bandwidth ≤ 10 MHz	max. 4
	bandwidth ≤ 100 MHz	max. 2
Number of RF channels per waveform file [5]	bandwidth ≤ 10 MHz	max. 32
	bandwidth > 10 MHz	1
ARB waveform files included	for DOCSIS 3.0	A-TDMA with 1.6 MHz bandwidth, A-TDMA with 3.2 MHz bandwidth, A-TDMA with 6.4 MHz bandwidth, S-CDMA with 1.6 MHz bandwidth, S-CDMA with 3.2 MHz bandwidth, S-CDMA with 6.4 MHz bandwidth
	for DOCSIS 3.1	OFDMA initial ranging, OFDMA fine ranging, OFDMA wideband probe, OFDMA bandwidth request, OFDMA data packet

[5] An ARB waveform file with a bandwidth of up to 10 MHz can be played on multiple RF channels at the same time. ARB waveform files with bandwidths > 10 MHz can be played only on one RF channel.

Operating modes

Since only one operating mode at a time can be active, the R&S®CLGD cannot generate downstream and upstream signals simultaneously.

Downstream signal generation

Downstream signal generation requires the R&S®CLGD-K200 option. The R&S®CLGD-K3018 frequency range extension is required for the enhanced downstream signal generation functionality.

DOCSIS 3.1 mode

Basic functionality		
Settable frequency range	downstream output, low	108 MHz to 1218 MHz
Number of DOCSIS 3.1 channels		max. 5
Number of single-carrier QAM channels		0
Enhanced functionality (R&S®CLGD-K3018 required)		
Settable frequency range	downstream output, high	252 MHz to 1794 MHz
Number of DOCSIS 3.1 channels		max. 8
Number of single-carrier QAM channels		0

Mixed mode

Basic functionality		
Settable frequency range	for DOCSIS 3.1 at downstream output, low	108 MHz to 1218 MHz
	for single-carrier QAM channels at downstream output, low	47 MHz to 1218 MHz
	simultaneously usable [6]	max. 1146 MHz
Number of DOCSIS 3.1 channels		max. 2
Number of single-carrier QAM channels	J.83/B, J.83/C (ISDB-C)	max. 160
	J.83/A (DVB-C)	max. 143
Enhanced functionality (R&S®CLGD-K3018 required)		
Settable frequency range	for DOCSIS 3.1 at downstream output, high	252 MHz to 1794 MHz
	for single-carrier QAM channels at downstream output, high	252 MHz to 1218 MHz
Number of DOCSIS 3.1 channels		max. 4
Number of single-carrier QAM channels	J.83/B, J.83/C (ISDB-C)	max. 160
	J.83/A (DVB-C)	max. 120

Upstream signal generation

Upstream signal generation requires the R&S®CLGD-K200 option.

Cable modem emulation mode

Upstream CM emulation mode		
Settable frequency range		5 MHz to 204 MHz
Number of DOCSIS 3.1 channels		max. 2
Number of DOCSIS 3.0 channels	with different parameters in each channel	max. 4
	with identical parameters in each channel	max. 32

Upstream burst timing control

Signal timing		continuous, burst, single-shot
Trigger delay		0 to 9999 µs
Burst spacing		0 to 9999 µs
Trigger output		0 to 9999 µs after trigger input
Resolution of timing settings		4 ns

[6] All simultaneously generated single-carrier QAM channels must lie within an 1146 MHz frequency band, i.e. between 47 MHz and 1193 MHz or between 72 MHz und 1218 MHz or in a maximally 1146 MHz wide frequency band in between these two. This limitation does not apply to the “Downstream High” output since the settable frequency band of 252 MHz to 1218 MHz for single-carrier QAM channels is less than 1146 MHz.

Signal interference simulation

The R&S®CLGD base unit enables the user to add a tilt to the output spectrum. All other signal interference simulations require the R&S®CLGD-K1050 option.

Tilt

Total setting range [7]		–15 dB (1 GHz) to +15 dB (1 GHz)
Step size of setting		0.1 dB
Tilt caused by analog filters [8]		–15 dB (1 GHz), –9 dB (1 GHz), 0, +9 dB (1 GHz), +15 dB (1 GHz)

AWGN (R&S®CLGD-K1050 option)

1 dB bandwidth		800 kHz to 200 MHz
Step size of setting		1 kHz
Center frequency		can be set in the active frequency range
Noise level		0 dBmV to 51 dBmV
Step size of setting		0.1 dB
Reference quantity of C/N		absolute noise level
		signal power in symbol rate of channel
		signal power in user-defined receiver bandwidth

Microreflections (R&S®CLGD-K1050 option)

The simulation of microreflections affects all active channels.

Number of reflections		0 to 5
Duration		0 to 5 µs
Step size of setting		0.1 µs
Attenuation		0 dB to 40 dB
Step size of setting		0.1 dB

AC hum (R&S®CLGD-K1050 option)

The R&S®CLGD simulates AC hum by superimposing amplitude modulation on all active channels.

Mains frequency		47 Hz to 200 Hz
Step size of setting		0.1 Hz
AM modulation depth		0 % to 6 %
Step size of setting		0.1 %

Narrowband interference signal and impulsive noise (R&S®CLGD-K1050 option)

The narrowband interference signal can be placed on any frequency in the frequency range of the selected mode and can overlap an active channel. To simulate impulsive noise, the narrowband interference signal can be periodically pulsed.

Mode		continuous, or periodically pulsed
Period length		0 s to 11.18 s
Step size of setting		1 µs
Pulse length		0 s to 5.59 s
Step size of setting		1 µs
Center frequency		any frequency in the frequency range of the selected mode
Interference signal level	referred to the wanted signal	–40 dB to +5 dB
Step size of setting		0.1 dB
Modulation		AWGN
Bandwidth		0 MHz to 20 MHz
Step size of setting		1 Hz

[7] The overall tilt is the sum of the frequency response of an analog filter and the level settings of the individual channels. For every desired tilt, the R&S®CLGD automatically finds the most favorable combination of analog filter and level setting.

[8] The fact that the tilt is set by an analog filter does not deteriorate signal-to-noise ratio versus frequency.

Phase noise (R&S®CLGD-K1050 option)

The phase noise affects all active channels.

Format [9]		double-sideband noise, integrated via a frequency decade, referenced to the level of the carrier, in dBc
Offset from carrier		1 kHz to 100 MHz
Characteristic		user-defined in frequency decades
Setting range	1 kHz to 10 kHz offset from carrier	–65 dBc to –30 dBc
	10 kHz to 100 kHz offset from carrier	–65 dBc to –44 dBc
	100 kHz to 1 MHz offset from carrier	–65 dBc to –50 dBc
	1 MHz to 10 MHz offset from carrier	–65 dBc to –51 dBc
	10 MHz to 100 MHz offset from carrier	–65 dBc to –57 dBc
Step size of setting		0.1 dBc

[9] The DOCSIS 3.1 standard specifies the phase noise in this relatively unusual format. The R&S CLGD also uses this format, making it easy to set the specifications found in the DOCSIS 3.1 standard. The user manual describes how to convert the phase noise to the more common single sideband format with a normalized bandwidth of 1 Hz.

Interfaces

RF outputs

The R&S®CLGD comes with four F male/F female adapters. Rohde & Schwarz recommends always leaving these adapters on the RF outputs of the R&S®CLGD to prevent wear on these outputs.

Downstream fundamental frequency range (Downstream Low connector)

Type		F female, 75 Ω
Frequency range		47 MHz to 1218 MHz
Return loss	47 MHz to 750 MHz	≥ 14 dB
	750 MHz to 870 MHz	≥ 13 dB
	870 MHz to 1218 MHz	≥ 12 dB

Downstream expanded frequency range (Downstream High connector)

Type		F female, 75 Ω
Frequency range		252 MHz to 1794 MHz
Return loss	258 MHz to 750 MHz	≥ 14 dB
	750 MHz to 870 MHz	≥ 13 dB
	870 MHz to 1218 MHz	≥ 12 dB
	1218 MHz to 1794 MHz	≥ 10 dB

Upstream

Type		F female, 75 Ω
Frequency range		5 MHz to 204 MHz
Return loss		≥ 10 dB

CSO/CTB

Type		F female, 75 Ω
Frequency range		47 MHz to 1002 MHz
Return loss	47 MHz to 750 MHz	≥ 14 dB
	750 MHz to 870 MHz	≥ 13 dB
	870 MHz to 1002 MHz	≥ 12 dB

Data and transport stream inputs

IP data inputs		2 × SFP+

Control inputs and output

reference input		BNC, 50 Ω
Reference frequency		10 MHz, 10.24 MHz
Trigger input		BNC, 50 Ω
Trigger output		BNC, 50 Ω
LAN control interface		RJ-45
Control via Wi-Fi		with USB Wi-Fi adapter [10]

Enhancements

USB interfaces		2 × USB type A

[10] Basically, control should be possible with every commercially available USB Wi-Fi adapter. The function was tested with the TL-WN722N adapter from TP-LINK.

General data

Environmental conditions		
Temperature	Operating temperature range	0 °C to +45 °C
Operating humidity		0 % to 50 %, noncondensing, max. 80 % for temperatures up to +31 °C, decreases linearly to 50 % at +45 °C
Mechanical resistance		
Vibration	operational	NEBS
	transport	NEBS transport 2B
Power rating		
Rated voltage		120 V to 240 V AC
Rated frequency		50 Hz to 60 Hz
Rated power		200 VA
Product conformity		
Electromagnetic compatibility		EN 55011, EN 61326-1, EN 61326-2-2
		ICES-003
		Part 15 of FCC Rules
		radio interference class A und basic immunity requirements
Electrical safety	in line with EU low voltage directive 2006/95/EC	applied harmonized standard: EN 61010-1
	USA	UL 61010-1
	Canada	CAN/CSA-C22.2 No. 61010-1
Calibration interval		after 12 months, then every 36 months
Dimensions	W × H × D	462 mm × 105 mm × 406 mm (19", 2 HU) (18.19 in × 4.13 × 15.98 in)
Weight		5.2 kg (11.46 lb)

Ordering information

Designation	Type	Order No.
DOCSIS Cable Load Generator, for TV and DOCSIS, base unit incl. power cable, quick start guide and CD-ROM with user manual	R&S®CLGD	2118.6956.02
Downstream Full Channel Load Generator	R&S®CLGD-K200	2118.6962.02
Upstream Cable Modem Emulator	R&S®CLGD-K300	2118.6979.02
Downstream Frequency Range Extension to 1794 MHz	R&S®CLGD-K3018	2118.6985.02
Signal Interference Simulation	R&S®CLGD-K1050	2118.6991.02
Rackmount Kit, 19", 2 HU	R&S®ZZA-KN2	1175.3010.00

Service options		
Extended Warranty, one year	R&S®WE1	Please contact your local Rohde & Schwarz sales office.
Extended Warranty, two years	R&S®WE2	
Extended Warranty, three years	R&S®WE3	
Extended Warranty, four years	R&S®WE4	

Extended warranty with a term of one to four years (WE1 to WE4)
Repairs carried out during the contract term are free of charge [11]. Necessary calibration and adjustments carried out during repairs are also covered. Simply contact the forwarding agent we name; your product will be picked up free of charge and returned to you in top condition a couple of days later.

For product brochure, see PD 3607.0123.12 and www.rohde-schwarz.com

[11] Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.

Service that adds value

- Worldwide
- Local and personalized
- Customized and flexible
- Uncompromising quality
- Long-term dependability

About Rohde&Schwarz

The Rohde&Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, radiomonitoring and radiolocation. Founded more than 80 years ago, this independent company has an extensive sales and service network and is present in more than 70 countries. The electronics group is among the world market leaders in its established business fields. The company is headquartered in Munich, Germany. It also has regional headquarters in Singapore and Columbia, Maryland, USA, to manage its operations in these regions.

Sustainable product design

- Environmental compatibility and eco-footprint
- Energy efficiency and low emissions
- Longevity and optimized total cost of ownership

Certified Quality Management
ISO 9001

Certified Environmental Management
ISO 14001

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R&S® is a registered trademark of Rohde&Schwarz GmbH&Co. KG
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R&S®CLGD DOCSIS Cable Load Generator
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